

# HIGHER REPRESENTATION THEORY, MATH 216A

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MWF 12-12:50am, MS 6201

This course is an introduction to higher representation theory, a version of representation theory where vector spaces are replaced by categories or higher structures.

The emphasis will be on algebraic aspects: Lie theory, representation theory, category theory. We will also discuss some of the geometrical aspects, as well as relations to low-dimensional topology.

Prerequisites: basic representation theory. Some knowledge of Lie theory will be helpful.

Topics to be discussed:

- Quiver Hecke algebras
- Representations of Kac-Moody algebras
- 2-Kac-Moody algebras
- 2-Representations
- Cyclotomic quiver Hecke algebras and simple 2-representations
- Hall algebras, moduli space of representations of quivers
- Tensor structures on 2-representations
- Link homology
- Four-dimensional topological quantum field theories

## References

R. Rouquier, 2-Kac-Moody algebras, 2008.

R. Rouquier, Quiver Hecke algebras and 2-Lie algebras, 2011.